

IN THE CLAIMS:

1-29 (cancelled)

- 1 30. (Previously Presented) A router for use in routing packets over a network, the
- 2 router supporting a plurality, X, of classes of service and including:
 - 3 A. a plurality of input ports for receiving packets over the network;
 - 4 B. a plurality of output ports for transferring packets over the network;
 - 5 C. a classifier for assigning packets received by the input ports to $X * Y$ classes
 - 6 of service, where * represents multiplication, and mapping the XY classes of service to
 - 7 the X classes of service that are supported by the router, the classifier assigning to the
 - 8 packet one of Y associated levels of priority, wherein each level of priority is associated
 - 9 with a different probability of packet loss;
 - 10 D. a buffer subsystem for retaining the packets in class of service per output port
 - 11 queues based on probabilities of discard associated with the $X * Y$ classes of service; and
 - 12 E. a scheduler for transferring the packets from the buffer subsystem through
 - 13 each of the output ports based on the X classes of service.
- 1 31. (Original) The router of claim 30 wherein the buffer subsystem includes multiple
- 2 storage locations and links available storage locations in a free queue.
- 1 32. (Original) The router of claim 31 wherein the buffer subsystem includes a proces-
- 2 sor that determines:
 - 3 i. a new weighted average depth for the free queue, and
 - 4 ii. a probability of discard for a given packet if the new weighted average queue
 - 5 depth falls below a predetermined maximum threshold associated with the class of ser-
 - 6 vice to which the packet is assigned by the classifier.

1 33. (Original) The router of claim 32 wherein the buffer subsystem discards a
2 given packet if the associated new weighted average depth for the free queue falls below
3 a minimum threshold associated with the class of service to which the packet is assigned.

1 34. (Original) The router of claim 33 wherein the buffer subsystem processor cal-
2 culates the probability of discard as $P_d = c - (m * A_{NEW})$ where c is an intercept and m is a
3 slope that is associated with a line that plots average free queue depth versus probability
4 of discard for the class of service to which the packet is assigned, and A_{NEW} is the new
5 weighted average depth of the free queue.

1 35. (Original) The router of claim 34 wherein the buffer subsystem processor cal-
2 culates the new weighted average depth of the free queue as $A_{NEW} = A_{CURRENT} + w(I -$
3 $A_{CURRENT})$ where w is a weighting factor, I represents the instantaneous depth of the free
4 queue and $A_{CURRENT}$ is the current weighted average depth of the free queue.

1 36. (Previously Presented) The router of claim 30 wherein the scheduler selects from
2 the buffer subsystem packets for transfer based on weighting factors associated with the
3 respective X classes of service.

1 37. (Previously Presented) A router for use in routing packets over a network, the
2 router supporting a plurality, X, of classes of service and including:
3 A. a plurality of input ports for receiving packets over the network;
4 B. a plurality of output ports for transferring packets over the network;
5 C. a multiple storage location buffer for retaining packets to be transferred
6 through the output ports;

7 D. a buffer subsystem for retaining the packets in class of service per output port
8 queues based on probabilities of discard associated with X*Y classes of service, where Y
9 represents a number and * represents multiplication; and

10 E. a scheduler for transferring the packets from the buffer subsystem through each
11 of the output ports based on the X classes of service that the router supports.

1 38. (Previously Presented) The router of claim 37 further including a classifier for:
2 i. assigning packets received by the input ports to X*Y classes of service,
3 ii. associating the packets with the X classes of service that are supported by the
4 router, and
5 iii. assigning to the packet one of Y associated levels of priority, wherein each
6 level of priority is associated with a different probability of packet loss.

1 39. (Previously Presented) The router of claim 37 wherein the buffer subsystem in-
2 cludes a processor that determines
3 i. a new weighted average queue depth for a free queue that links available buffer
4 storage locations, and
5 ii. a probability of discard for a given packet if the new weighted average free
6 queue depth falls below a predetermined maximum threshold associated with the class of
7 service to which the packet is assigned.

1 40. (Original) The router of claim 39 wherein the buffer subsystem processor calcu-
2 lates the probability of discard as $P_d = c - (m * A_{NEW})$ where c is an intercept and m is a
3 slope that are associated with a line that plots average free queue depth versus probability
4 of discard for the class of service to which the packet is assigned, and A_{NEW} is the new
5 weighted average depth of the free queue.

1 41. (Original) The router of claim 40 wherein the buffer subsystem processor calcu-
2 lates the new depth of the weighted average free queue as $A_{NEW} = A_{CURRENT} + w (I -$
3 $A_{CURRENT})$ where w is a weighting factor, I represents the instantaneous depth of the free
4 queue and $A_{CURRENT}$ is the current weighted average depth of the free queue.

1 42. (Previously Presented) The router of claim 40 wherein the buffer subsystem dis-
2 cards a given packet if the new weighted average free queue depth falls below a mini-
3 mum threshold associated with the class of service to which the packet is assigned.

1 43. (Previously Presented) The router of claim 40 wherein the buffer subsystem re-
2 tains a given packet if the new weighted average free queue depth is above a maximum
3 threshold associated with the class of service to which the packet is assigned.

1 44. (Previously Presented) The router of claim 37 wherein the scheduler selects
2 packets for transfer through each output port based on weighting factors associated with
3 the respective X classes of service.

1 45. (currently amended) An apparatus for routing packets through a router that sup-
2 ports a plurality, X, of classes of service, the apparatus comprising:

3 means for receiving packets through one or more input ports and assigning the
4 packets to X^*Y classes of service, where Y represents a number and * represents multi-
5 plication;

6 means for retaining or discarding packets based on probabilities of discard associ-
7 ated with the X^*Y classes of service in a multiple storage location buffer that links avail-
8 able storage locations to a free queue; and

9 means for transferring the packets through one or more output ports based on the
10 X classes of service.

1 46. (Previously Presented) The apparatus of claim 45, further including:
2 means for associating packets assigned to the X*Y classes of service with the X
3 classes of service supported by the apparatus; and
4 means for assigning to the respective packets one of Y associated levels of prior-
5 ity, each level of priority being associated with a different probability of packet loss.

1 47. (Previously Presented) The apparatus of claim 46, further comprising:
2 means for determining a new weighted average depth for the free queue; and
3 means for determining a probability of discard for a given packet if the new
4 weighted average free queue depth falls below a predetermined maximum threshold as-
5 sociated with the class of service to which the packet is assigned.

1 48. (Previously Presented) The apparatus of claim 47, wherein the means for retain-
2 ing packets further comprises:
3 means for discarding a given packet if the new weighted average free queue depth
4 is less than a minimum threshold associated with the class of service to which the packet
5 is assigned.

1 49. (Previously Presented) The apparatus of claim 47, wherein the means for retaining
2 packets further comprises:
3 means for retaining a given packet if the new weighted average free queue depth
4 is greater than a maximum threshold associated with the class of service to which the
5 packet is assigned.

1 50. (currently amended) A computer-readable media, comprising:
2 instructions for execution in a processor for the practice of a method, said
3 method having the steps,
4 receiving packets through one or more input ports and assigning the pack-
5 ets to X^*Y classes of service, where * represents multiplication, and Y represents
6 a number,
7 retaining packets based on probabilities of discard associated with the
8 X^*Y classes of service in a multiple storage location buffer that links available
9 storage locations to a free queue; and
10 transferring the packets through one or more output ports based on the X
11 classes of service.

1 51. (Previously Presented) The computer-readable media of claim 50, wherein the
2 method further comprises the steps of:
3 associating packets assigned to the X^*Y classes of service with the X
4 classes of service supported by the apparatus; and
5 assigning to the respective packets one of Y associated levels of priority,
6 each level of priority being associated with a different probability of packet loss.

1 52. (previously presented) The computer-readable media of claim 51, wherein the
2 method further comprises the steps of:
3 determining a new weighted average depth for the free queue; and
4 determining a probability of discard for a given packet if the new weighted
5 average free queue depth falls below a predetermined maximum threshold associ-
6 ated with the class of service to which the packet is assigned.

1 53. (Previously Presented) The computer-readable media of claim 52, wherein the
2 method further comprises the step of:

3 discarding a given packet if the new weighted average free queue depth is
4 less than a minimum threshold associated with the class of service to which the
5 packet is assigned.

1 54. (Previously Presented) The computer-readable media of claim 52, wherein the
2 method further comprises the step of:

3 retaining a given packet if the new weighted average free queue depth is
4 greater than a maximum threshold associated with the class of service to which
5 the packet is assigned.

1 55. (currently amended) Electromagnetic signals propagating on a computer network,
2 comprising:

3 instructions for execution on a processor for the practice of a method, said
4 method having the steps,

5 receiving packets through one or more input ports and assigning the pack-
6 ets to X^*Y classes of service, where * represents multiplication;

7 retaining or discarding packets based on probabilities of discard associated
8 with the X^*Y classes of service in a multiple storage location buffer that links
9 available storage locations to a free queue; and

10 transferring the packets through one or more output ports based on the X
11 classes of service.

1 56. (Previously Presented) The electromagnetic signals of claim 55, wherein the
2 method further comprises the steps of:

3 associating packets assigned to the X*Y classes of service with the X
4 classes of service supported by the apparatus; and
5 assigning to the respective packets one of Y associated levels of priority,
6 each level of priority being associated with a different probability of packet loss.

1 57. (Previously Presented) The electromagnetic signals of claim 56, wherein the
2 method further comprises the steps of:

3 determining a new weighted average depth for the free queue; and
4 determining a probability of discard for a given packet if the new weighted
5 average free queue depth falls below a predetermined maximum threshold associ-
6 ated with the class of service to which the packet is assigned.

1 58. (Previously Presented) The electromagnetic signals of claim 57, wherein the
2 method further comprises the step of:

3 discarding a given packet if the new weighted average free queue depth is
4 less than a minimum threshold associated with the class of service to which the
5 packet is assigned.

1 59. (Previously Presented) The electromagnetic signals of claim 57, wherein the
2 method further comprises the step of:

3 retaining a given packet if the new weighted average free queue depth is
4 greater than a maximum threshold associated with the class of service to which
5 the packet is assigned.